

**Amendment and Response**

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Serial No.: 09 651,217

Confirmation No.: 2006

Filed: 30 August 2000

For: METHODS FOR USE IN PACKAGING APPLICATIONS USING AN ADHESIVE COMPOSITION**Remarks**

The Office Action mailed 5 June 2002 has been received and reviewed. Claims 90 and 92 were canceled without prejudice. Claim 11 was amended to recite the subject matter provided in claims 90 and 92. Claims 1-14, 22-64, 83-89 and 91 are pending. Reconsideration and withdrawal of the rejections are respectfully requested

**The 35 U.S.C. §103(a) Rejection****Claims 1-6 and 8-10, 34-39, 42-53, 55-59, 61, 62 and 64**

Claims 1-6 and 8-10, 34-39, 42-53, 55-59, 61, 62 and 64 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,286,679 to Farnworth *et al.* (hereinafter "Farnworth") in view of U.S. Patent No. 3,825,580 to Kato *et al.* (hereinafter "Kato").

Applicants respectfully traverse the rejections.

Farnworth provides a method for attaching a semiconductor die to a leadframe. The method includes forming a patterned adhesive layer on a side of a semiconductor wafer prior to singulation of the dies from the wafer. The adhesive layer is patterned such that wire bonding pads on the dies, as well as the streets between the dies, are free of adhesive material. The adhesive is stated to be a thermoplastic or thermoset adhesive. During a packaging process for attaching a die to a leadframe, the thermoplastic or thermoset adhesive layer is heated and the lead fingers of the leadframe are placed in contact with the die under pressure.

Kato provides a heat-resistant instant adhesive composition comprising a radical polymerizable alpha-cyanoacrylate. The adhesive is instantaneously adhesive at room temperature, and has a sufficiently practical bonding strength at temperatures of 150°C or above.

A proper *prima facie* case of obviousness requires (1) some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or combine reference teachings, (2) a reasonable expectation of success, and finally (3) the references must teach or suggest all the claim limitations.

Claim 1

With respect to claim 1, Applicants respectfully repeat the arguments presented in the response to the Office Action dated December 10, 2001.

In that response, Applicants respectfully submitted that the cited documents fail to support a proper *prima facie* case of obviousness. For example, the cited references fail to provide a sufficient suggestion or motivation to modify or combine the references.

Farnworth provides a method for attaching a semiconductor die to a leadframe with a thermoplastic or a thermoset adhesive. Kato provides a heat-resistant instant adhesive composition comprising a radical polymerizable alpha-cyanoacrylate. Neither of the cited documents and the Office Action, however, identify a motivation or suggestion as to why one skilled in the art would replace the thermoplastic or the thermoset adhesive of Farnworth with the adhesive of Kato. Farnworth does not identify any problems or concerns with the use of the thermoplastic or the thermoset adhesive. The Office Action also fails to identify any problems or concerns with the use of the thermoplastic or the thermoset adhesive that are overcome by the use of the adhesive of Kato. Thus, the Office Action has failed to identify any specific understanding or principle within the knowledge of the skilled artisan that would have provided the motivation to use a different adhesive in Farnworth, such as the one recited in the instant claims.

Furthermore, the cited documents fail to provide for a reasonable expectation of success. Kato provides heat-resistant instant adhesive compositions comprising a radical polymerizable alpha-cyanoacrylate, but fails to indicate that these adhesives can be used in an adhesive pattern configuration, *e.g.*, one or more zones are essentially free of the instant setting adhesive composition, as recited in claim 1. Kato lacks any teaching at all concerning whether such an adhesive of Kato can be applied with some zones being essentially free of the adhesive. In fact, U.S. Patent No. 4,720,513 to Kameyama *et al.*, cited by the Examiner, indicates that " $\alpha$ -cyanoacrylate adhesive is characterized in that it is readily flowable with low viscosity, having the property of being easily used for penetration adhesion or automatic coating" (Col. 1, lines 24-27). Thus, one skilled in the art would appreciate that the low-viscosity characteristic of  $\alpha$ -

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cyanoacrylate adhesives would not allow for the formation of an adhesive pattern configuration, *e.g.*, one or more zones are essentially free of the instant setting adhesive composition, as recited in claim 1.

Claim 34

With respect to claim 34, Applicants respectfully submit that the cited documents fail to support a proper *prima facie* case of obviousness as the documents, besides other things, fail to teach or suggest all the claim limitations. For example, the Examiner states that "Farnworth et al. do not specifically teach the instant temperature range" but "Farnworth et al. do teach heat applied for bonding, and also teach an adhesive application temperature of about 100 to about 500 degrees Celsius". As discussed above, Farnworth provides a thermoplastic or thermoset adhesive. The Examiner's rejection, however, fails to indicate where the cited documents teach or suggest using an instant setting adhesive composition under pressure and at a temperature of about 200 degrees Celsius or less, as recited in claim 34. As one skilled in the art would appreciate, instant setting adhesive compositions and thermoplastic or thermoset adhesive are different, and as such may have different bonding characteristics at elevated temperatures and pressures.

Claims 35-39, 43-47, 49, 51-53, 55-56, 58-59, 61, 62 and 64

With respect to claims 35-39, 43-47, 49, 51-53, 55-56, 58-59, 61, 62 and 64, Applicants respectfully repeat the arguments presented in the response to the Office Action dated December 10, 2001.

Claim 42

With respect to claim 42, Applicants respectfully submit that the cited documents fail to support a proper *prima facie* case of obviousness as the documents, besides other things, fail to teach or suggest all the claim limitations. For example, the cited documents fail to teach

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applying an encapsulant on portions of the die attached to the leadframe, where the encapsulant comprises an instant setting adhesive composition, as recited in claim 42.

The Examiner asserts that "Farnworth et al. teach an adhesive applied to one surface of a die, and the die is attached to the leadframe . . . [where] [t]he adhesive layer effectively encapsulates the internal surface of the die which it covers." Applicants respectfully traverse this assertion and respectfully submit that Farnworth fails to provide support for this assertion. For example, Farnworth recites that the "semiconductor package 34 includes an encapsulating material 36 which encapsulates the chip 10 and all but a terminal portion 38 of the lead fingers 28" where the "encapsulating material 36 is typically formed of an insulative plastic material" (Col. 4, lines 20-25). So, Farnworth provides an encapsulating material (36) that is separate and distinct from the "adhesive" that the Examiner suggests be used as the encapsulant.

In addition, Applicants respectfully submit the cited documents fail to support a proper *prima facie* case of obviousness. Applicants respectfully repeat the argument presented above for claim 34 in support of the position that the cited documents fail to support a proper *prima facie* case of obviousness.

**Claim 48**

With respect to claim 48, Applicants respectfully submit that the cited documents fail to support a proper *prima facie* case of obviousness as the documents, besides other things, fail to provide a sufficient suggestion or motivation to modify or combine the references. For example, the cited documents fail to provide for a reasonable expectation of success. Kato provides heat-resistant instant adhesive compositions comprising a radical polymerizable alpha-cyanoacrylate, but fails to indicate that these adhesives can be used in applying an instant setting adhesive composition in a pattern, e.g., the pattern having the instant setting adhesive composition on regions of the wafer such that singulation streets and bond pads are essentially free of the instant setting adhesive composition, as recited in claim 48. Kato lacks any teaching at all concerning whether such an adhesive of Kato can be applied with some zones being essentially free of the adhesive. In fact, U.S. Patent No. 4,720,513 to Kameyama *et al.*, cited by the Examiner,

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indicates that " $\alpha$ -cyanoacrylate adhesive is characterized in that it is readily flowable with low viscosity, having the property of being easily used for penetration adhesion or automatic coating" (Col. 1, lines 24-27). Thus, one skilled in the art would appreciate that the low-viscosity characteristic of  $\alpha$ -cyanoacrylate adhesives would not allow applying an instant setting adhesive composition in a pattern, *e.g.*, the pattern having the instant setting adhesive composition on regions of the wafer such that singulation streets and bond pads are essentially free of the instant setting adhesive composition, as recited in claim 48.

Claims 50 and 57

With respect to claims 50 and 57, Applicants respectfully repeats the arguments presented in the response to the Office Action dated December 10, 2001.

In addition, Applicants respectfully submit that the cited documents fail to support a proper *prima facie* case of obviousness as the documents fail to teach or suggest all the claim limitations. For example, the Examiner states that "Farnworth et al. do not specifically teach the instant temperature range" but "Farnworth et al. do teach heat applied for bonding, and also teach an adhesive application temperature of about 100 to about 500 degrees Celsius". As discussed above, Farnworth provides a thermoplastic or thermoset adhesive. The Examiner's rejection, however, fails to indicate where the cited documents teach or suggest applying pressure at an elevated temperature to attach the die to the leadframe with an instant setting adhesive composition, where the elevated temperature is about 200 degrees Celsius or less, as recited in claims 50 and 57. As one skilled in the art would appreciate, instant setting adhesive compositions and thermoplastic or thermoset adhesive are different, and as such may have different bonding characteristics at elevated temperatures and pressures.

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Based on the forgoing, Applicants respectfully submit the cited documents fail to support a proper *prima facie* case of obviousness for the rejection of claims 1-6 and 8-10, 34-39, 42-53, 55-59, 61, 62 and 64.

Applicants respectfully request reconsideration and allowance of claims 1-6 and 8-10, 34-39, 42-53, 55-59, 61, 62 and 64.

Claim 7

With respect to claim 7, Applicants respectfully traverse the rejection and respectfully repeat the arguments presented in the response to the Office Action dated December 10, 2001.

In addition, Applicants respectfully submit the cited documents fail to support a proper *prima facie* case of obviousness. Applicants respectfully repeat the argument presented above for claim 1 in support of the position that the cited documents fail to support a proper *prima facie* case of obviousness.

Applicants respectfully request reconsideration and allowance of claim 7.

Claims 40 and 41

Claims 40 and 41 were rejected under 35 U.S.C. §103(a) as being unpatentable over Farnworth and Kato, and further in view of U.S. Pat. No. 5,399,416 to Bujard. Applicants respectfully traverse the rejections.

With respect to claims 40 and 41, Applicants respectfully submit the cited documents fail to support a proper *prima facie* case of obviousness. Applicants respectfully repeat the argument presented above for claim 34 in support of the position that the cited documents fail to support a proper *prima facie* case of obviousness.

Applicants respectfully request reconsideration and allowance of claims 40 and 41.

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Claims 54 and 63

Claims 54 and 63 were rejected under 35 U.S.C. §103(a) as being unpatentable over Farnworth and Kato as applied to claims 53 and 62 above, and further in view of Eichelberger (U.S. Patent No. 5,841,193). Applicants respectfully traverse the rejections.

Applicants repeat the argument presented above for claims 53 and 62 in support of the patentability of claims 54 and 63, respectively.

Applicants respectfully request reconsideration and allowance of claims 54 and 63.

Claim 60

The Examiner rejected claim 60 under 35 U.S.C. §103(a) as being unpatentable over Farnworth and Kato as applied to claims 57 above, and further in view of Farnworth et al. (U.S. Patent No. 5,893,726). Applicants respectfully traverse the rejection.

With respect to claim 60, Applicants respectfully submit the cited documents fail to support a proper *prima facie* case of obviousness. Applicants respectfully repeat the argument presented above for claim 57 in support of the position that the cited documents fail to support a proper *prima facie* case of obviousness.

Applicants respectfully request reconsideration and allowance of claim 60.

Claims 11-14, 22-27 and 30-33

Claims 11-14, 22-27 and 30-33 were rejected under 35 U.S.C. §103(a) as being unpatentable over Farnworth in view of Kato and U.S. Patent No. 4,720,513 to Kameyama *et al.* (hereinafter "Kameyama"). Applicants address the rejections as follows.

Claim 11

Applicants have amended claim 11 to include the subject matter of now cancelled claims 90 and 92. Insofar as the rejection is applied to claim 11 as amended, Applicants respectfully traverse the rejection and submit that the claims were amended to more distinctly claim the invention, and were not made to necessarily distinguish over the cited references.

Applicants respectfully submit that the cited documents fail to support a proper *prima facie* case of obviousness as the documents, besides other things, fail to teach or suggest all the claim limitations. For example, Examiner asserted for now cancelled claim 90 that "Kimura et al. teach setting times of 10 seconds and 30 seconds for a cyanoacrylate adhesive applied to a surface (column 10, lines 57 et seq.)". Kimura provides that the "adhesive composition showed a set time of 10 seconds on NBR rubber, 30 seconds on steel and a tensile shear strength of bond of 180 kgf/cm<sup>2</sup> (NBR) and 330 kgf/cm<sup>2</sup> (steel)" (Col. 10, lines 60-63). So, Kimura teaches set time for bonding materials and not set times for a cyanoacrylate adhesive applied to a surface. This point is supported at Note 2 of Table 1 in Kimura, which states in part "(2) Setting time: To a test piece [*sic*] of NBR . . . was applied one drop of the adhesive composition and another test piece of the identical size was butted thereagainst, and the assembly was allowed to stand for a predetermined period of time . . . [i]f the bonded surfaces were not peeled thereby, said predetermined period is expressed as setting time" (Table 1, Col. 9-10). In addition, Kimura also fails to teach or suggest set times for the adhesive to become non-flowable and to substantially maintain a configuration in which the adhesive was applied within 0.1 seconds to about 120 seconds, as recited in claim 11. As such, the cited documents fail to teach or suggest all the limitations of claim 11.

Applicants also respectfully submit that there are a variety of cyanoacrylate adhesives, where each cyanoacrylate adhesive can have different characteristics as compared to other cyanoacrylate adhesives. These different characteristics can make each cyanoacrylate adhesive more suitable for certain applications versus other applications. Applicants respectfully submit that the cited documents fail to teach or suggest a suitable cyanoacrylate adhesive for use on a wafer, let alone an instant setting adhesive composition that includes a thixotropic index from about 4 to about 6 that becomes non-flowable and substantially maintains the configuration in which it was applied within about 0.1 seconds to about 120 seconds at a temperature of about 20°C to about 30°C after it is applied to the surface of the wafer, as recited in claim 11.



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Claims 12-14, 22-27 and 31-33

Applicants respectfully traverse the rejections of claims 12-14, 22-27 and 31-33.

With respect to claims 12-14, Applicants repeat the argument presented above for claim 11 in support of the patentability of claims 12-14.

With respect to claims 22-27 and 31-33, Applicants respectfully submit the cited documents fail to support a proper *prima facie* case of obviousness, and respectfully repeat the arguments presented in the response to the Office Action dated December 10, 2001 in support thereof.

Claim 30

Applicants respectfully traverse the rejection of claim 30 and respectfully submit that the cited documents, besides other things, fail to support a proper *prima facie* case of obviousness. For example, the cited documents fail to teach or suggest all the claim limitations. For example, the cited documents fail to teach applying an encapsulant on portions of the die attached to the leadframe, where the encapsulant comprises an instant setting adhesive composition, as recited in claim 30.

The Examiner asserts that "Farnworth et al. teach an adhesive applied to one surface of a die, and the die is attached to the leadframe . . . [where] [t]he adhesive layer effectively encapsulates the internal surface of the die which it covers." Applicants respectfully traverse this assertion and respectfully submits that Farnworth fails to provide support for this assertion. For example, Farnworth recites that the "semiconductor package 34 includes an encapsulating material 36 which encapsulates the chip 10 and all but a terminal portion 38 of the lead fingers 28" where the "encapsulating material 36 is typically formed of an insulative plastic material" (Col. 4, lines 20-25). So, Farnworth provides an encapsulating material (36) that is separate and distinct from the "adhesive" that the Examiner suggests be used as the encapsulant. As such, the cited documents recognize that an adhesive layer is insufficient to encapsulate the die.

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In addition, Applicants repeat the argument presented above for claim 22 in support of the patentability of claim 30.

Applicants respectfully request reconsideration and allowance of claim 30.

Based on the forgoing, Applicants respectfully submit the cited documents fail to support a proper *prima facie* case of obviousness for the rejection of claims 11-14, 22-27 and 30-33.

Applicants respectfully request reconsideration and allowance of claims 11-14, 22-27 and 30-33.

Claims 28 and 29

Claims 28 and 29 were rejected under 35 U.S.C. §103(a) as being unpatentable over Farnworth and Kato, and further in view of U.S. Pat. No. 5,399,416 to Bujard. Applicants respectfully traverse the rejections.

With respect to claims 28 and 29, Applicants respectfully submit the cited documents fail to support a proper *prima facie* case of obviousness. Applicants respectfully repeat the argument presented above for claim 22 in support of the position that the cited documents fail to support a proper *prima facie* case of obviousness.

Applicants respectfully request reconsideration and allowance of claims 28 and 29.

Claims 83-89

Claims 83-89 were rejected under 35 U.S.C. §103(a) as being unpatentable over Farnworth in view of Kato, and U.S. Patent No. 4,321,180 to Kimura et al.(hereinafter "Kimura"). Applicants respectfully traverse the rejections.

With respect to claim 83, Applicants respectfully repeat the arguments presented in the response to the Office Action dated December 10, 2001.

In addition, Applicants respectfully submit that the cited documents fail to support a proper *prima facie* case of obviousness as the documents fail to provide a sufficient suggestion or motivation to modify or combine the references. For example, the cited documents fail to

provide for a reasonable expectation of success. Kato provides heat-resistant instant adhesive compositions comprising a radical polymerizable alpha-cyanoacrylate, but fails to indicate that these adhesives can be used in applying an instant setting adhesive composition onto a plurality of portions of a surface, where the adhesive composition becomes non-flowable and substantially maintains the configuration in which the instant setting adhesive composition is applied, as recited in claim 83. Kato lacks any teaching at all concerning whether such an adhesive of Kato can be applied onto a plurality of portions of a surface, where the adhesive becomes non-flowable and substantially maintains the configuration in which it is applied. In fact, U.S. Patent No. 4,720,513 to Kameyama *et al.*, cited by the Examiner, indicates that " $\alpha$ -cyanoacrylate adhesive is characterized in that it is readily flowable with low viscosity, having the property of being easily used for penetration adhesion or automatic coating" (Col. 1, lines 24-27). Thus, one skilled in the art would appreciate that the low-viscosity characteristic of  $\alpha$ -cyanoacrylate adhesives would not allow applying an instant setting adhesive composition onto a plurality of portions of a surface, where the adhesive composition becomes non-flowable and substantially maintains the configuration in which the instant setting adhesive composition is applied, as recited in claim 83.

Furthermore, Applicants respectfully submit that the cited documents fail to support a proper *prima facie* case of obviousness as the documents fail to teach or suggest all the claim limitations. For example, the Examiner states that "Kimura et al. teach setting times of 10 seconds and 30 seconds for a cyanoacrylate adhesive applied to a surface (column 10, lines 57 et seq.)". Kimura provides that the "adhesive composition showed a set time of 10 seconds on NBR rubber, 30 seconds on steel and a tensile shear strength of bond of 180 kgf/cm<sup>2</sup> (NBR) and 330 kgf/cm<sup>2</sup> (steel)" (Col. 10, lines 60-63). So, Kimura teaches set time for bonding materials and not set times for a cyanoacrylate adhesive applied to a surface. This point is supported at Note 2 of Table 1 in Kimura, which states in part "(2) Setting time: To a test piece [*sic*] of NBR . . . was applied one drop of the adhesive composition and another test piece of the identical size was butted thereagainst, and the assembly was allowed to stand for a predetermined period of time . . . [i]f the bonded surfaces were not peeled thereby, said predetermined period is expressed

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as setting time" (Table 1, Col. 9-10). In addition, Kimura also fails to teach or suggest times for the adhesive to become non-flowable and to substantially maintain a configuration in which the adhesive was applied within 0.1 seconds to about 120 seconds, as recited in claim 83.

Based on the forgoing arguments, Applicants respectfully submit the cited documents fail to support a proper *prima facie* case of obviousness for the rejection of claims 83-89.

Applicants respectfully request reconsideration and allowance of claims 83-89.

Claims 90-92

Claims 90-92 were rejected under 35 U.S.C. §103(a) as being unpatentable over Farnworth and Kato as applied to claim 11 above, and further in view of U.S. Patent No. 4,321,180 to Kimura *et al.* Applicant addresses the rejections as follows.

Claims 90 and 92 have been cancelled without prejudice.

With respect to claim 91, Applicants respectfully traverses the rejection and submit the cited documents fail to support a proper *prima facie* case of obviousness. Applicants respectfully repeats the arguments presented above for claim 11 in support of the position that the cited documents fail to support a proper *prima facie* case of obviousness.

Applicants respectfully request reconsideration and allowance of claim 91.

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**Summary**

It is respectfully submitted that the pending claims 1-14, 22-64, 83-89 and 91 are in condition for allowance and notification to that effect is respectfully requested. The Examiner is invited to contact Applicants' Representatives, at the below-listed telephone number, if it is believed that prosecution of this application may be assisted thereby.

Respectfully submitted for  
Cobbley et al.

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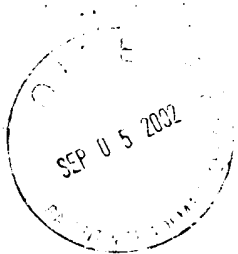
**CERTIFICATE UNDER 37 CFR §1.10:**

"Express Mail" mailing label number: EV 183606411 US Date of Deposit: September 5 2002

The undersigned hereby certifies that this paper is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR §1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

By: 

Name: Sara E. Olson



**APPENDIX A - SPECIFICATION/CLAIM AMENDMENTS  
INCLUDING NOTATIONS TO INDICATE CHANGES MADE**

**Serial No.: 09/651,217**

**Docket No.: 150.0072 0102**

Amendments to the following are indicated by underlining what has been added and bracketing what has been deleted.

**In the Claims**

For convenience, all pending claims are shown below.

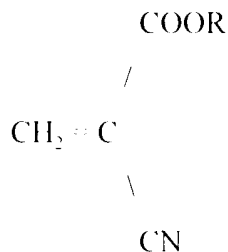
1. A method for applying an adhesive to a wafer comprising:  
providing a wafer having a surface; and  
applying an instant setting adhesive composition on the surface of the wafer in a configuration wherein a plurality of portions of the surface have the instant setting adhesive composition applied thereon, and further wherein one or more zones of the surface are essentially free of the instant setting adhesive composition.
2. The method of claim 1 further comprising singulating the wafer to form at least one die having the instant setting adhesive composition on at least a portion thereof.
3. The method of claim 2 wherein the zones comprise singulation streets.
4. The method of claim 1 wherein the zones comprise regions having exposed bond pads.
5. The method of claim 1 wherein applying the instant setting adhesive composition to the surface of the wafer comprises a technique selected from the group of screen printing, depositing and patterning, syringe applying, stenciling, dip coating, spraying, dot shooting, and combinations thereof.
6. The method of claim 1 wherein the instant setting adhesive comprises an adhesive component selected from the group of a cyanoacrylate adhesive, an anaerobic acrylic adhesive, and mixtures thereof.

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7. The method of claim 1 further comprising applying an adhesion promoter to the surface of the wafer prior to applying the instant setting adhesive composition.

8. The method of claim 1 wherein the instant setting adhesive composition comprises at least one optional additive selected from the group of a thermal stabilizer, a thickener, a plasticizer, a toughener, a conductive filler, a dielectric additive, a moisture stabilizer, a curing inhibitor, an adhesion promoter, a storage stabilizer, a colorant, and an organic solvent.

9. The method of claim 1 wherein the instant setting adhesive composition comprises a cyanoacrylic adhesive component comprising a monomer of the formula:



wherein R is selected from the group of a C<sub>1-6</sub> alkyl, a cycloalkyl, an alkenyl, an alkynyl, a cycloalkenyl, an alkaryl, an aralkyl, and an aryl group.

10. The method of claim 9 wherein R is selected from the group of a methyl group, an ethyl group, an n-propyl group, an isopropyl group, an n-butyl group, an isobutyl group, a pentyl group, a hexyl group, an allyl group, a methallyl group, a crotyl group, a propargyl group, a cyclohexyl group, a benzyl group, a phenyl group, a cresyl group, a 2-chlorobutyl group, a trifluoroethyl group, a 2-methoxyethyl group, a 3-methoxybutyl group and a 2-ethoxyethyl group.

11.(Amended) A method for applying an adhesive to a wafer comprising:

providing a wafer having a surface; and

applying an instant setting adhesive composition on the surface of the wafer in a configuration wherein a plurality of portions of the surface have the instant setting adhesive composition dispensed thereon and one or more zones are essentially free of the instant setting adhesive composition, wherein the instant setting adhesive composition has a thixotropic index from about 4 to about 6, and becomes non-flowable and substantially maintains the configuration in which the instant setting adhesive composition was applied within about 0.1 seconds to about 120 seconds at a temperature of about 20°C to about 30°C after the instant setting adhesive composition is applied to the surface.

12. The method of claim 11 wherein applying the instant setting adhesive composition comprises one of stenciling and screen printing.

13. The method of claim 11 wherein the instant setting adhesive comprises an adhesive component selected from the group of a cyanoacrylate adhesive, an anaerobic acrylic adhesive, and mixtures thereof.

14. The method of claim 11 wherein the one or more zones include singulation streets and regions having exposed bond pads and further comprising singulating the wafer along the singulation streets to form at least one die having the instant setting adhesive coated on at least a portion thereof.

22. A method for use in packaging a die comprising:

providing a die;

providing a leadframe; and

using an instant setting adhesive composition to attach the die to a portion of the leadframe, wherein the instant setting adhesive composition comprises an adhesive component



selected from the group of a cyanoacrylate adhesive, an anaerobic acrylic adhesive, and mixtures thereof and further wherein the instant setting adhesive composition has a thixotropic index from about 4 to about 6.

23. The method of claim 22 wherein the die includes the instant setting adhesive composition applied thereon.

24. The method of claim 22 wherein the leadframe includes the instant setting adhesive composition applied on at least a portion thereof.

25. The method of claim 24 wherein the die includes the instant setting adhesive composition applied on a back surface of the die.

26. The method of claim 25 wherein the die includes the instant setting adhesive composition applied on at least a portion of a face surface of the die.

27. The method of claim 26 wherein the face surface of the die comprises exposed die bond pads.

28. The method of claim 22 further comprising using an instant setting adhesive composition comprising a conductive filler to form a heat sink; and attaching the heat sink to a portion of the die or the leadframe.

29. The method of claim 28 wherein the method further comprises assembling a package including the die and the leadframe, wherein the heat sink is attached to the package.

30. The method of claim 22 wherein the method further comprises applying an encapsulant on portions of the die attached to the leadframe, wherein the encapsulant comprises an instant setting adhesive composition.

31. The method of claim 22 wherein using the instant setting adhesive composition comprises attaching a plurality of lead fingers of the leadframe to the die, wherein the lead fingers include the instant setting adhesive composition applied on at least a portion thereof.

32. The method of claim 22 wherein using the instant setting adhesive composition comprises attaching the die to a mounting paddle, wherein the mounting paddle includes the instant setting adhesive composition applied on at least a portion thereof.

33. The method of claim 22 wherein using the instant setting adhesive composition comprises using a technique selected from the group of screen printing, depositing and patterning, syringe applying, stenciling, dip coating, spraying, dot shooting, and combinations thereof to apply the instant setting adhesive composition.

34. A method for use in packaging a die comprising:  
    providing a die;  
    providing a leadframe; and  
    using an instant setting adhesive composition to attach the die to a portion of the leadframe under pressure and a temperature of about 200°C or less.

35. The method of claim 34 wherein the die includes the instant setting adhesive composition applied thereon.

36. The method of claim 34 wherein the leadframe includes the instant setting adhesive composition applied on at least a portion thereof.

37. The method of claim 36 wherein the die includes the instant setting adhesive composition applied on a back surface of the die.
38. The method of claim 34 wherein the die includes the instant setting adhesive composition applied on at least a portion of a face surface of the die.
39. The method of claim 38 wherein the face surface of the die comprises exposed die bond pads.
40. The method of claim 34 further comprising using an instant setting adhesive composition comprising a conductive filler to form a heat sink; and attaching the heat sink to a portion of the die or the leadframe.
41. The method of claim 40 wherein the method further comprises assembling a package including the die and the leadframe, wherein the heat sink is attached to the package.
42. The method of claim 34 wherein the method further comprises applying an encapsulant on portions of the die attached to the leadframe, wherein the encapsulant comprises an instant setting adhesive composition.
43. The method of claim 34 wherein using the instant setting adhesive composition comprises attaching a plurality of lead fingers of the leadframe to the die, wherein the lead fingers include the instant setting adhesive composition applied on at least a portion thereof.
44. The method of claim 34 wherein using the instant setting adhesive composition comprises attaching the die to a mounting paddle, wherein the mounting paddle includes the instant setting adhesive composition applied on at least a portion thereof.

45. The method of claim 34 wherein using the instant setting adhesive composition comprises using a technique selected from the group of screen printing, depositing and patterning, syringe applying, stenciling, dip coating, spraying, dot shooting, and combinations thereof to apply the instant setting adhesive composition.

46. A method for attaching a semiconductor die to a leadframe comprising:

providing an instant setting adhesive composition including an adhesive component selected from the group of a cyanoacrylate adhesive, an anaerobic acrylic adhesive, and mixtures thereof;

applying the instant setting adhesive composition on at least a portion of a wafer including a plurality of dice; and

singulating dice from the wafer; and

attaching a die having the instant setting adhesive composition applied on at least a portion thereof to a portion of a leadframe.

47. The method of claim 46 wherein the portion of the leadframe comprises a mounting paddle and the surface of the wafer comprises a back surface of the wafer.

48. The method of claim 46 wherein applying the instant setting adhesive composition comprises applying the instant setting adhesive composition in a pattern on the wafer, the pattern including the instant setting adhesive composition on regions of the wafer such that singulation streets and bond pads being essentially free of the instant setting adhesive composition.

49. The method of claim 46 wherein attaching the die on a portion of the leadframe comprises:

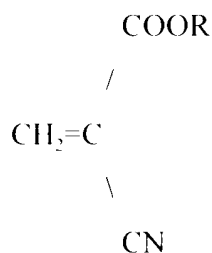
positioning a portion of the die having the instant setting adhesive composition thereon adjacent to the portion of the leadframe; and

applying pressure at an elevated temperature to attach the die to the leadframe.

50. The method of claim 49 wherein the elevated temperature is about 200°C or less.
51. The method of claim 46 wherein the portion of the leadframe comprises one or more lead fingers of a lead on chip leadframe and the surface of the wafer comprises a face surface of the wafer.
52. The method of claim 46 wherein the portion of the leadframe comprises one or more lead fingers and the surface of the wafer comprises a back surface of the wafer.
53. A method for attaching a semiconductor die to a leadframe:  
dispensing an instant setting adhesive composition on the leadframe, the instant setting adhesive composition comprising an adhesive component selected from the group of a cyanoacrylate adhesive, an anaerobic acrylic adhesive, and mixtures thereof;  
placing the die in contact with the instant setting adhesive composition; and  
forming a bond between the die and the leadframe with the instant setting adhesive composition.
54. The method of claim 53 further comprising applying a catalyst to the leadframe, die or to the instant setting adhesive composition prior to forming the bond between the die and the leadframe.
55. The method of claim 53 wherein the leadframe includes a mounting paddle.
56. The method of claim 53 wherein the leadframe comprises a lead-on-chip leadframe.
57. A method for attaching a semiconductor die to a leadframe:  
providing the leadframe with a mounting paddle;  
dispensing an instant setting adhesive composition on the mounting paddle;

placing a die in contact with the instant setting adhesive composition; and  
applying pressure at a temperature of about 200°C or less to bond the die to the  
leadframe with the instant setting adhesive composition.

58. The method of claim 57 wherein the instant setting adhesive composition comprises a  
cyanoacrylate adhesive component with a formula:



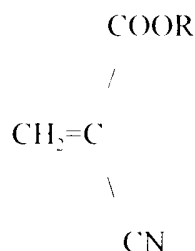
wherein R is selected from the group of a C<sub>1-6</sub> alkyl, a cycloalkyl, an alkenyl, an alkynyl,  
a cycloalkenyl, an alkaryl, an aralkyl, and an aryl group.

59. The method of claim 57 wherein dispensing the instant setting adhesive composition  
comprises a method selected from the group consisting of screen printing, depositing and  
patterning, syringe applying, stenciling, dip coating, spraying, dot shooting, and combinations  
thereof.

60. The method of claim 57 wherein dispensing the instant setting adhesive composition  
comprises forming a pattern of dots.

61. The method of claim 57 further comprising adding at least one optional additive selected  
from the group of a thermal stabilizer, a thickener, a plasticizer, a toughener, a conductive filler,  
a dielectric additive, a moisture stabilizer, a curing inhibitor, an adhesion promoter, a storage  
stabilizer, a colorant, and an organic solvent.

62. A method for attaching a lead-on-chip semiconductor die to a lead-on-chip leadframe:
- providing the leadframe with a plurality of lead fingers configured to form a die mounting area;
  - dispensing an instant setting adhesive composition on the lead fingers in the die mounting area, said instant setting adhesive composition comprising an adhesive component selected from the group of a cyanoacrylate adhesive, an anaerobic acrylic adhesive, and mixtures thereof and an electrically insulating filler;
  - placing the die in contact with the instant setting adhesive composition; and
  - forming a bond between the die and the lead fingers with the instant setting adhesive composition.
63. The method of claim 62 further comprising applying a catalyst to the lead fingers, die or the instant setting adhesive composition prior to the placing step.
64. The method of claim 62 wherein the cyanoacrylate adhesive comprises a monomer with a formula:



wherein R is selected from the group of a C<sub>1-6</sub> alkyl, a cycloalkyl, an alkenyl, an alkynyl, a cycloalkenyl, an alkaryl, an aralkyl, and an aryl group.

83. A method for applying an adhesive to a wafer comprising:
- providing a wafer having a surface; and
  - applying an instant setting adhesive composition onto a plurality of portions of the surface of the wafer in a configuration, wherein the instant setting adhesive composition

becomes non-flowable and substantially maintains the configuration in which the instant setting adhesive composition is applied within about 0.1 seconds to about 120 seconds after the instant setting adhesive is applied to the surface.

84. The method of claim 83 wherein the instant setting adhesive composition becomes non-flowable and substantially maintains the configuration within about 0.1 seconds to about 60 seconds.

85. The method of claim 83 wherein the instant setting adhesive composition becomes non-flowable and substantially maintains the configuration within 0.1 seconds to 120 seconds at a temperature of about 20°C to about 30°C.

86. The method of claim 83 wherein one or more zones of the surface are essentially free of the instant setting adhesive composition, and further wherein the zones comprise singulation streets.

87. The method of claim 83 wherein one or more zones of the surface are essentially free of the instant setting adhesive composition, and further wherein the zones comprise regions having exposed bond pads.

88. The method of claim 83 wherein applying the instant setting adhesive composition to the surface of the wafer comprises a technique selected from the group of screen printing, depositing and patterning, syringe applying, stenciling, dip coating, spraying, dot shooting, and combinations thereof.

89. The method of claim 83 wherein the instant setting adhesive comprises an adhesive component selected from the group of a cyanoacrylate adhesive, an anaerobic acrylic adhesive, and mixtures thereof.



91. The method of claim 11 wherein the instant setting adhesive composition becomes non-flowable and substantially maintains the configuration within about 0.1 seconds to about 60 seconds.